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Because the triangle  $FDE'$  is isosceles the similar triangle  $FAC'$  is isosceles, therefore  $AC' = AF$ . Through  $C'$  draw  $C'H'$  parallel with  $AD$  and intersecting  $PP'$  in  $H'$ . Then, by similar triangles, we have,

$$E'F : FD :: E'C' : C'H'.$$

Also

$$E'F : FG' :: E'C' : C'B'.$$

But  $FG' = FD$  by construction;  $\therefore C'B' = C'H' = AD$ .

[*J. E. Hendricks.*]

## EXERCISES.

### 329

WHAT relations must subsist between the lengths of the edges of a tetrahedron in order that the perpendiculars from the vertices to the opposite sides may meet in a common point?

[*Yale Prize Problem.*]

### 330

FIND the sum of the series

$$1^2 + 3^2 + 6^2 + 10^2 + 15^2 + \dots + [\tfrac{1}{2}n(n+1)]^2.$$

[*Artemas Martin.*]

### 331

THE extremities of a diameter of a variable ellipse having fixed foci lie on a fixed hyperbola having the same foci; show that the extremities of the conjugate diameter lie on another hyperbola having the same foci.

[*W. Woolsey Johnson.*]

### 332

FOUR equianharmonic points give four triangles which have four circumcircles. Show that the inverses of any point with regard to these four circles are equianharmonic.

[*Frank Morley.*]

### 333

SHOW that

$$\sin \theta > \theta - \frac{\theta^3}{3!} + \frac{1}{45} \left[ \frac{\theta^5}{2^2} - \frac{\theta^7}{2^9} + \dots (-)^{m+1} \frac{\theta^{2m+3}}{2^{4(m^2+9m+6)}} \pm \dots \right];$$

the general term being the  $m$ th within the brackets.

[*W. H. Echols.*]

### 334

FIND the necessary relation between the ten distances of five points in space.

[*Yale Prize Problem.*]